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Research Article

# Knowlegde on Hepatitis B and Associated Factors amongst Pregnant Women in Bangourain Health District, West Region of Cameroon

## *Connaissances sur l'Hépatite B et les Facteurs Associés chez les Femmes Enceintes du District Sanitaire de Bangourain, dans la Région Ouest du Cameroun*

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## ABSTRACT

**Introduction**. Hepatitis B is a major public health problem in Cameroon, where over 1.6 million people live with chronic infection and mother-to-child transmission remains a critical issue. Knowledge of the disease among pregnant women is a key determinant of preventing this transmission. This study aimed to assess the level of knowledge about hepatitis B among pregnant women in the Bangourain Health District and to identify associated factors. **Methods**. We conducted a cross-sectional analytical study from April 1 to June 30, 2025, in all 20 health facilities of the district. A pretested questionnaire was administered to consenting pregnant women. Knowledge level was classified as poor (<60%), moderate (60-79%), and high (≥80%). Multinomial logistic regressions identified associated factors, with significance set at $p<0.05$. **Results**. Among 236 participants, mean age was 27.8 years. Only 18.2% (n=43) had a high knowledge level. Most knew about sexual transmission (76.7%), mother-to-child transmission (76.7%), and the risk of liver cancer (76.7%). However, 81.8% were unaware that hepatitis B is not transmitted through air or intact skin contact. In multivariate analysis, residence in the Kouhouat health area (OR=1.46; p=0.040) and a history of blood transfusion (OR=4.63; p=0.044) were associated with higher knowledge. **Conclusion**. Knowledge about hepatitis B among pregnant women in Bangourain Health District was insufficient. Targeted awareness campaigns, integrating health areas and transfusion history, are needed to improve prevention of mother-to-child transmission.

## RÉSUMÉ

**Introduction**. L'hépatite B constitue un problème de santé publique majeur au Cameroun, où plus de 1,6 million de personnes vivent avec l'infection chronique et où la transmission mère-enfant reste un enjeu crucial. La connaissance de la maladie par les femmes enceintes est un déterminant essentiel de la prévention de cette transmission. Cette étude visait à évaluer le niveau de connaissances sur l'hépatite B chez les femmes enceintes du district de santé de Bangourain et à identifier les facteurs associés. **Méthodes**. Nous avons mené une étude transversale analytique du 1er avril au 30 juin 2025 dans les 20 structures de santé du district. Un questionnaire pré-testé a été administré aux femmes enceintes consentantes. Le niveau de connaissances a été classé en faible (<60%), moyen (60-79%) et élevé (≥80%). Des régressions logistiques multinomiales ont identifié les facteurs associés, avec un seuil de significativité à $p<0,05$. **Résultats**. Sur 236 participantes, l'âge moyen était de 27,8 ans. Seules 18,2% (n=43) présentaient un niveau de connaissances élevé. La majorité connaissait les modes de transmission par voie sexuelle (76,7%), la transmission mère-enfant (76,7%) et le risque de cancer du foie (76,7%). Cependant, 81,8% ignoraient que l'hépatite B ne se transmet pas par l'air ou par contact cutané intact. En analyse multivariée, résider dans l'aire de santé de Kouhouat (OR=1,46; p=0,040) et avoir un antécédent de transfusion sanguine (OR=4,63; p=0,044) étaient associés à un meilleur niveau de connaissances. **Conclusion**. Les connaissances sur l'hépatite B chez les femmes enceintes du district de Bangourain étaient insuffisantes. Des campagnes de sensibilisation ciblées, intégrant les aires de santé et les antécédents de transfusion, sont nécessaires pour améliorer la prévention de la transmission mère-enfant.



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**HIGHLIGHTS FOR READERS IN A HURRY**

**What is already known on this topic.** Hepatitis B affects 254 million people world. wide, with high prevalence in sub-Saharan Africa. In Cameroon, over 1.6 million people live with chronic infection. Mother-to-child transmission accounts for 90% of chronic infections in children, underscoring the importance of disease knowledge among pregnant women to prevent this transmission. Previous studies in Africa have shown insufficient knowledge levels, ranging from 24 to 76% poor knowledge.

**The problem this study addressed.** In the Bangourain Health District (West Cameroon), no data existed on pregnant women's knowledge of hepatitis B. This study aimed to assess this knowledge and identify associated factors to guide public health interventions.

**What this study adds to our knowledge.** Among 236 pregnant women, only 18.2% had a high knowledge level. Knowledge of transmission routes (76.7%) and complications (76.7%) was relatively good, but 81.8% were unaware of false transmission routes. Residing in Kouhouat (OR=1.46) and having a history of blood transfusion (OR=4.63) were associated with better knowledge. None of the participants had been vaccinated against hepatitis B.

**How this is relevant to clinical practice and research.** These findings support intensified awareness campaigns in less performing health areas, integrating messages on transmission routes and misconceptions. The zero vaccination coverage highlights the urgency of integrating hepatitis B vaccination into maternal health programs. Qualitative studies are needed to understand barriers to vaccination.

## INTRODUCTION

According to the World Health Organization, an estimated 254 million people were living with chronic hepatitis B infection in 2022, with approximately 1.2 million new infections occurring annually. In Cameroon, as of 2022, approximately 1,617,774 people were living with hepatitis B infection, with over 14,764 new cases reported and more than 4,505 deaths attributed to its complications (Global Hepatitis Report, 2024).

Hepatitis B is a viral infection that primarily affects the liver and can lead to both acute and chronic disease. Transient infections run a course of several months, and chronic infections are often lifelong. The natural history of chronic HBV infection progresses through four sequential phases: immune tolerance, immune clearance, immune control and reactivation phases. Up to 40% of patients with chronic HBV infection develop liver complications. (Carey, 2009; Chen & Yang, 2011; McMahon, 2005; Zanetti et al., 2008) Chronic infections can lead to liver failure with cirrhosis and hepatocellular carcinoma. (Lee, 1997; Liaw & Chu, 2009; Locarnini, 2004; Seeger & Mason, 2000; Wilkins et al., 2019)

The prevalence of chronic hepatitis B virus (HBV) infection varies by geographic region. Most of North America is a low-prevalence (< 2%) area. Certain high-prevalence pockets exist, especially areas with a high proportion of Asian immigrants and Alaskan and northern Canadian native populations, where rates of chronic HBV are as high as 5% to 15%. (Global Hepatitis Report, 2024) In most low-prevalence areas, HBV infection is acquired mainly during adolescence and mid-adulthood, whereas perinatal transmission is the main route in high-prevalence (≥ 8%) areas. (Carey, 2009; Hou et al., 2005; Poddar et al., 2021)

Screening for hepatitis B is recommended in pregnant women at their first prenatal visit and in adolescents and adults at high risk of chronic infection.(Conners, 2023; Wilkins et al., 2019) Hepatitis B vaccination is recommended for medically stable infants weighing 2,000 g or more within 24 hours of birth, unvaccinated infants and children, and unvaccinated adults requesting protection from hepatitis B or who are at increased risk of infection. (Van Damme et al., 2025; Lee, 1997; Liaw & Chu, 2009; Locarnini, 2004; Seeger & Mason, 2000; Wilkins et al., 2019)

The risk of developing chronic HBV infection is highest when infection occurs during the perinatal period. Therefore, prevention of mother-to-child transmission (MTCT) during pregnancy and delivery represents a critical intervention point and an essential strategy toward HBV elimination. Consequently, strategies aimed at preventing MTCT are among the most effective approaches for breaking this cycle and reducing HBV prevalence over time (Wen et al., 2014).

Infection acquired during the neonatal period leads to chronic infection in approximately 90% of cases, compared to about 50% in children infected at three years of age and only 5% in adults (Luo et al., 2012). Although long-term complications are less frequent in children, cirrhosis may develop in 1–5% of HBeAg-positive children, and hepatocellular carcinoma has been reported in about 0.5% of pediatric HBV carriers, underscoring the need for continuous monitoring (Childs et al., 2018).

However, despite the high prevalence, morbidity and mortality related to early childhood transmission of Hepatitis B, most studies conducted in Low and middle income countries reported poor knowledge of hepatitis B amongst pregnant women which were associated with age of participants, monthly income, area of residence(Urban/rural), and occupation. (Adeyemi et al., 2013, Frambo et al., 2014 , Kwadzokpui et al., 2020). Poor knowledge implies poor preventive measures put in place to curb the spread.

Therefore, this study aims to determine the knowledge on hepatitis B infection and the associated factors among pregnant women, in order to develop targeted interventions and guide effective control measures.

## PATIENTS AND METHODS

- **Population and sampling**

The study was carried out in Bangourain health district, West region of Cameroon, which is one of the 20 Health districts that make up the West region of Cameroon comprised of 6 health areas and 20 health facilities in 2025. The National health system information estimated a total of 54 417 inhabitants and an expected 2191 pregnant women (4.11%) in Bangourain Health district in 2024 as shown on table 1.



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A cross-sectional analytical study was carried out on all pregnant women that visited the health facilities during the study period and who consented to participate in the study. The total sample size was calculated using the Lwanga and Hemeshow formula at 95% Confidence interval, with the prevalence of Hepatitis B estimated at 7,5% (Eyong *et al.*, 2019), at a precision of 5% and adjusted for non-response rate of 10% and stratification effect.

The number of pregnant women recruited per health area was estimated based on the proportion of expected pregnant women in that health area, to the total of the district as shown on table 1.

**Table 1. Calculation of the sample size per Health area, Bangourain Health District, 2024**

| Health area | Expected pregnant women in 2024 (A) | Proportion with respect to the District (B= A*100/Total) | Number of Pregnant women to be recruited. (C= 236* x B) |
|---|---|---|---|
| Bangambi | 247 | 11.14% | 26 |
| Bangourain | 1 017 | 45.85% | 108 |
| Kouhouat | 250 | 11.27% | 27 |
| Koumengba | 465 | 16.45% | 39 |
| Kourom | 164 | 7.44% | 18 |
| Koutoukpih | 175 | 7.89% | 18 |
| Total Bangourain Health district | 2 218 | 100% | 236* |

*where 236 is the total sample size estimated using the Lwanga and Lemeshow formula at 95% CI, p=7.5% (Eyong et al., 2019), d= 5% and adjusting for non-response rate of 10% and stratification effect.

Participants were recruited through a consecutive sampling procedure from all the 20 health facilities in the 6 health areas. We included in our study all pregnant women met at the health facility who came for antenatal consultation and who accepted to participate in the study.

- **Questionnaire and data collection**

Six trained secondary investigators visited health facilities during antenatal clinic and vaccination days. Pregnant women that met the inclusion criteria and gave their consent were recruited into the study. The questionnaires were given to the women to answer. The investigators also assisted those that could not read in interpreting the questions and answers in the local language (Bamoun).

The questionnaire was divided into three parts: Part A was on the Sociodemographic characteristics and comprised of 9 questions on the age group, level of education, matrimonial status, type of matrimony, religion, health area of residence, nature of site of residence, monthly income, and occupation. Part B was on the medical factors made up of 25 questions on: gestational age at antenatal booking, trimester of pregnancy, Parity, Hepatitis B Vaccination status, Hepatitis B screening, HIV status, close contact with a patient with Hepatitis B, Knows someone with Hepatitis B, and health education on hepatitis B. It also included questions on the past history of blood transfusion, D and C for abortion, surgery, admission into health facility, STIs, tooth extraction, home delivery by traditional birth attendant. Part C was on the knowledge on hepatitis B made up of 44 questions and subdivided into 4 sections: knowledge on transmission (17 questions), natural history (5 questions), clinical management (5 questions), and epidemiology and prevention (6 questions). This section had two other questions that permitted us to get the final score of the participant and then classifying the knowledge level.

Content validity and Face validity was achieved by submitting the data collection tools to the supervisor for expert review and necessary corrections made. The reliability of the questionnaire was obtained by pretesting of the instrument on 24 participants in nearby Massangam District Hospital, West region of Cameroon. The reliability coefficient (Cronbach's Alpha) was $\alpha$=0.987.

- **Method of Data Analysis**

Data obtained was entered, checked and analyzed using SPSS version 26 and MS Excel version 2016 and presented in tables, percentage and charts. The knowledge level was calculated by attributing scores to each question on the knowledge section of the questionnaire. Each question had a score of 1. The questionnaire consisted of 44 Questions to assess the knowledge level of the participants. The score generated was expressed as a percentage and the participants were graded as Poor (score less than 60%), moderate (score of 60-79.99%) and High (score of 80 and above). This is the Al Mubaish system of classification and was used by a similar study in Ghana.(Kwadzokpui et al., 2020). Associations between variables were done using chi square and multinomial logistic regression. Statistical significance was set at p value less than 0.05.

- **Ethical Considerations**

Ethical clearance was obtained from the ethics Committee of the regional delegation of Public Health for the West Region. Administrative authorization was obtained from the regional delegate of Public health for the West regions. Informed consent of the participants was obtained, participation was voluntary, questionnaires were anonymous and all data was treated as confidential.

## RESULTS

- **Sociodemographic characteristics of the participants**

A total of 246 participants were recruited in this study, most of whom were aged 20 to 29 years (n=144; 61.0%). The most represented religion were muslims (n=224; 94.9%). Most of the participants were residents in Bangourain health area (n=108; 45.8%) and 97.9% (n=241) of the participants were living in the rural areas. The most represented occupation was housewife (n=176; 74.6%) as 92.8% (n=219) of the participants were



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married and 98.7% (n=222) of the participants had a monthly income of 0- 44 999 FCFA (0- 78.25USD). With regard to education, most of the participants had completed primary school (n=227; 96.2%). (Table 2).

- **Medical Characteristics of the respondents**

The gestational age at antenatal booking varied from 8 to 48 weeks of amenorrhea with a mean age of 24.44 ± 6.407 weeks of amenorrhea.

**Table 2. Sociodemographic Characteristics of participants**

| Variables | N | % |
|---|---|---|
| **Age** | | |
| 10-19 years | 38 | 16.1 |
| 20-29 years | 144 | 61.0 |
| 40-49 years | 45 | 19.1 |
| 40-49 years | 7 | 3.0 |
| 50+ years | 2 | 0.8 |
| **Religion** | | |
| Christian | 12 | 5.1 |
| Muslim | 224 | 94.9 |
| **Health area of résidence** | | |
| Bangambi | 26 | 11.1 |
| Bangourain | 108 | 45.8 |
| Kouhouat | 27 | 11.4 |
| Koumengba | 39 | 16.5 |
| Kourom | 18 | 7.6 |
| Koutoukpih | 18 | 7.6 |
| **Nature of Area of residence** | | |
| Rural | 231 | 97.9 |
| Urban | 5 | 2.1 |
| **Occupation** | | |
| Farmer | 39 | 16.5 |
| Housewife | 176 | 74.6 |
| Student | 4 | 1.7 |
| Others | 17 | 7.2 |
| **Marital status** | | |
| Cohabitation | 2 | 0.8 |
| Divorced | 6 | 2.5 |
| Married (traditional, municipal or religious) | 219 | 92.8 |
| Single | 9 | 4.8 |
| **Level of education** | | |
| Tertiary education | 0 | 0 |
| Completed Secondary | 0 | 0 |
| Completed primary | 227 | 96.2 |
| No formal education | 9 | 4.8 |
| **Monthly income of household** | | |
| 0- 44 999 FCFA | 232 | 98.3 |
| 44 000 -99 999 FCFA | 4 | 1.7 |
| 100 00 -199 999 FCFA | 0 | 0 |
| ≥200 000 FCFA | 0 | 0 |

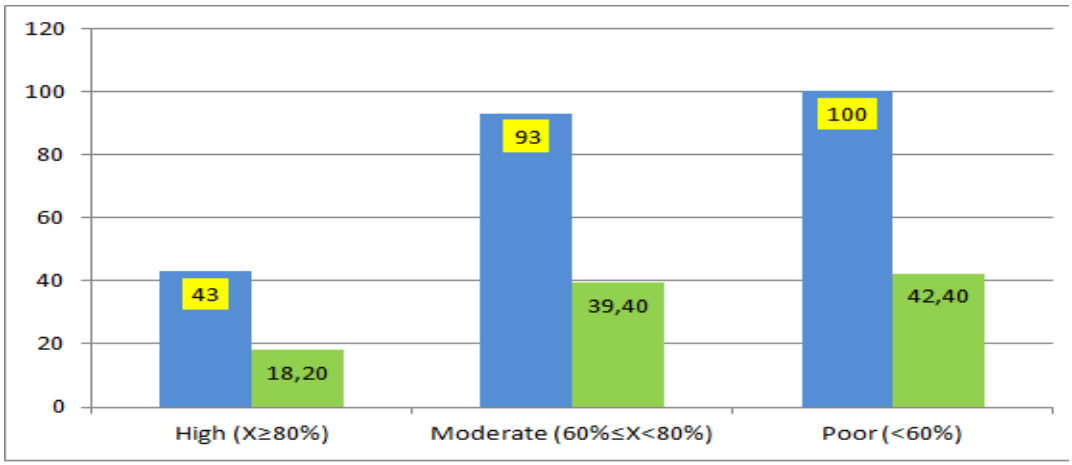


Figure 1. Repartition of the participants according to their knowledge level



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Most of the participants started their antenatal in the second trimester of pregnancy (n=117; 49.6%), were multiparous women (n=206; 87.4%), had been diagnosed for sexually transmissible diseases (n=244; 98.7%), had ever received health education during antenatal consultations or from any health personnel on hepatitis B( n=211; 89.4%) and none of them had been vaccinated against Hepatitis B (n=246; 100%). Only 11.9% (n=28) of the participants had ever been screened for hepatitis B and all those screened said to have had negative results.

The screening was done more than 1 year ago in over 74.1% (n=20) of those who had been screened. Also, 7.6% (n=18) of the participants had been transfused in the past and 66.7% (n=12) of them had been transfused just one time. Most of the transfusions were carried out in District Hospitals (n=9; 50%) followed by Integrated Health Cetres (n=7; 48.9%).In addition, 1.7% (n=4) of the participants had undergone uterine revision for abortion in the past with carried out in clandestine clinics (n=2, 50%), Integrated Health Centres (n=1; 25%) and personal home of personnel (n=1; 25%). Furthermore, 0.8% (n=2) and 1.7% (n=4) of the participants have undergone surgery once and were HIV positive respectively. All participants have ever been admitted in a health facility and none has ever undergone traditional tonsillectomy. Close contact with a patient with Liver disease or Hepatitis B was reported in 6.4% (n=15) of the participants. Moreso, few participants had ever been delivered of a baby in the house by traditional birth attendants (n=9; 4.8%) and ever had tooth extraction (n=6; 2.5%). All tooth extractions were done at home of personnel. (Table 3)

- **Knowledge of participants on hepatitis B infection**
- ***Knowledge of transmission***

From table 4 below, most of the participants knew that Hepatitis B can be transmitted by having unprotected vaginal sex with an infected person (n=181; 76.7%), having unprotected anal sex with a person with hepatitis B (n=181, 76.7%), mother to child during pregnancy (n=178; 75.4%), mother to child during child birth (n=181, 76.7%), mother to child during breast feeding (n=178; 75.4%), wet kissing (mixing saliva) a person with Hepatitis B (n=178; 75.4%), chewing food and feeding a child with (n=178; 75.4%), sharing toothbrushes (n=178; 75.4%), sharing sharps and injecting equipment like razor blades, needles used in acupuncture, tattooing, body piercing or drug use (n=175; 74.2%).

**Table 3. Medical Characteristics of the participants**

| Variables | N | % |
|---|---|---|
| **Trimester of pregnancy at booking** | | |
| 1st trimester | 37 | 15.7 |
| 2nd trimester | 117 | 49.6 |
| 4rd trimester | 82 | 34.7 |
| **Parity** | | |
| Grand Multiparous(above 5) | 4 | 1.7 |
| Multiparous(2 to 5) , | 206 | 87.3 |
| Primiparous (1), | 20 | 8.5 |
| Nulliparous(0) | 6 | 2.5 |
| **Hepatitis B vaccination** | | |
| Yes | 0 | 0 |
| No | 236 | 100.0 |
| **Hepatitis B screening test** | | |
| No | 208 | 88.1 |
| Yes | 28 | 11.9 |
| **If yes. Result of HepB screening test** | | |
| Negative | 28 | 100 |
| Positive | 0 | 0 |
| **Duration of last Hep B test** | | |
| 1 month ago | 4 | 14.3 |
| 6 months ago | 4 | 14.3 |
| 1 year or more ago | 20 | 71.4 |
| **History of blood transfusion** | | |
| No | 218 | 92.4 |
| Yes | 18 | 7.6 |
| **If yes Number of times transfused** | | |
| 1 time | 12 | 66.7 |
| 2 to 4 times | 6 | 33.3 |
| 5 to 9 times | 0 | 0 |
| ≥ 10 times | 0 | 0 |
| **If yes Site of transfusion(s)** | | |
| District Hospitals | 9 | 50.0 |
| Integrated Health centre/Lay Private/Confessional HC | 7 | 38.9 |
| Others senior graded hospital | 2 | 11.1 |


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**Table 3. Medical Characteristics of the participants**

| Variables | N | % |
|---|---|---|
| **History of uterine revision(D and C) for abortion** | | |
| No | 232 | 98.3 |
| Yes | 4 | 1.7 |
| **If yes Site where D and C was carried out** | | |
| Clandestine clinics | 2 | 50.0 |
| Integrated Health centre/Lay Private/Confessional HC | 1 | 25.0 |
| Personal homes of health personnel | 1 | 25.0 |
| **History of surgery** | | |
| No | 234 | 99.2 |
| Yes | 2 | 0.8 |
| **HIV status** | | |
| Negative | 232 | 98.3 |
| Positive | 4 | 1.7 |
| **History of admission into a Health Facility** | | |
| Yes | 236 | 100.0 |
| No | 0 | 0 |
| **Traditional tonsillectomy** | | |
| Yes | 0 | 0 |
| No | 236 | 100.0 |
| **Close contact with someone with liver disease or hepatitis B** | | |
| No | 221 | 93.6 |
| Yes | 15 | 6.4 |
| **Diagnosed of a sexually transmissible infection in the hospital** | | |
| No | 4 | 1.3 |
| Yes | 232 | 98.7 |
| **Home delivery by traditional birth attendants** | | |
| No | 227 | 96.2 |
| Yes | 9 | 4.8 |
| **Tooth extraction** | | |
| No | 230 | 97.5 |
| Yes | 6 | 2.5 |
| **Site of tooth extraction** | | |
| Personal homes of health personnel | 6 | 100% |
| Total | 6 | 100% |
| **Health education during antenatals or from any health personnel on hepatitis B** | | |
| No | 25 | 10.6 |
| Yes | 211 | 89.4 |

**Table 4. Participants' responses on the transmission of hepatitis B**

| Variables | N=236 | % |
|---|---|---|
| **By having unprotected vaginal sex with a person with hepatitis B** | | |
| False | 4 | 1.7 |
| I don't know | 51 | 21.6 |
| True | 181 | 76.7 |
| **By having unprotected anal sex with a person with hepatitis B** | | |
| False | 4 | 1.7 |
| I don't know | 51 | 21.6 |
| True | 181 | 76.7 |
| **From mother to child during pregnancy** | | |
| False | 4 | 1.7 |
| I don't know | 54 | 22.9 |
| True | 178 | 75.4 |
| **From mother to child during childbirth** | | |
| False | 4 | 1.7 |
| I don't know | 51 | 21.6 |
| True | 181 | 76.7 |
| **From mother to child during breast feeding (breast milk)** | | |
| False | 6 | 2.5 |
| I don't know | 52 | 22.1 |
| True | 178 | 75.4 |
| **By touching (the intact skin) of a person with hepatitis B** | | |
| False | 184 | 78.0 |
| I don't know | 52 | 22.0 |
| True | 0 | 0 |


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**Table 4. Participants' responses on the transmission of hepatitis B**

| Variables | N=236 | % |
|---|---|---|
| **By kissing on a healthy jaw or hand of a person with hepatitis B** | | |
| False | 184 | 78.0 |
| I don't know | 52 | 22.0 |
| True | 0 | 0 |
| **By wet kissing(mixing saliva) a person with Hepatitis B** | | |
| False | 6 | 2.5 |
| I don't know | 52 | 22.1 |
| True | 178 | 75.4 |
| **By eating food prepared by a person with hepatitis B** | | |
| False | 181 | 76.7 |
| I don't know | 55 | 24.3 |
| True | 0 | 0 |
| **Through the air when a person with hepatitis B coughs or sneezes** | | |
| False | 6 | 2.5 |
| I don't know | 55 | 23.3 |
| True | 175 | 74.2 |
| **By sharing eating utensils(no saliva contact)** | | |
| False | 184 | 78.0 |
| I don't know | 52 | 22.0 |
| True | 0 | 0 |
| **By sharing foods (no saliva contact)** | | |
| False | 181 | 76.7 |
| I don't know | 55 | 24.3 |
| **By chewing food and feeding a child with** | | |
| False | 6 | 2.5 |
| I don't know | 52 | 22.1 |
| True | 178 | 75.4 |
| **By sharing toothbrushes** | | |
| False | 6 | 2.5 |
| I don't know | 52 | 22.1 |
| True | 178 | 75.4 |
| **By sharing sharps and injecting equipment, e.g. razor blades, needles used in acupuncture, tattooing, body piercing or drug use** | | |
| False | 6 | 2.5 |
| I don't know | 55 | 23.3 |
| True | 175 | 74.2 |

**Table 5. Participants' responses on the natural history of hepatitis B**

| Variables | N=236 | % |
|---|---|---|
| **Hepatitis B can cause liver damage** | | |
| False | 0 | 0 |
| I don't know | 55 | 23.3 |
| True | 181 | 76.7 |
| **Hepatitis B can cause liver cancer** | | |
| False | 0 | 0 |
| I don't know | 55 | 23.3 |
| True | 181 | 76.7 |
| **Most people infected with hepatitis B have no symptoms** | | |
| False | 3 | 1.3 |
| I don't know | 55 | 23.3 |
| True | 178 | 75.4 |
| **People with hepatitis B can be infected for life** | | |
| False | 3 | 1.3 |
| I don't know | 58 | 24.6 |
| True | 175 | 74.1 |
| **Alcohol further damages the liver for people with hepatitis B** | | |
| False | 0 | 0 |
| I don't know | 55 | 23.3 |
| True | 181 | 76.7 |


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**Table VI. Multinomial logistic regression of sociodemographic and medical factors associated with knowledge level**

| Knowledge level | Variables | P | Odds Ratio | 95% CI |
|---|---|---|---|---|
| High (≥ 80 %) | Constant | 0.991 | – | – |
| | Religion | 0.980 | $4.64 \times 10^{-7}$ | [0.00 – ∞] |
| | **Health area of residence** | **0.040** | **1.458** | **[1.040 – 1.791]** |
| | Parity | 0.294 | 1.457 | [0.768 – 2.498] |
| | Blood transfusion | 0.584 | 1.645 | [0.281 – 9.504] |
| | Uterine revision (D&C) | – | 1.274 | [1.274 – 1.274] |
| | HIV status | – | – | – |
| | Home delivery by TBA | 0.989 | $2.15 \times 10^{7}$ | [0.00 – ∞] |
| | Tooth extraction | 0.992 | $2.89 \times 10^{-7}$ | [0.00 – ∞] |
| Moderate (60 – 79 %) | Constant | 0.995 | – | – |
| | Religion | 0.979 | $2.15 \times 10^{-7}$ | [0.00 – ∞] |
| | **Health area of residence** | **0.004** | **1.420** | **[1.129 – 1.786]** |
| | Parity | 0.269 | 0.714 | [0.494 – 1.297] |
| | **Blood transfusion** | **0.044** | **4.628** | **[1.048 – 12.675]** |
| | Uterine revision (D&C) | 0.988 | $4.98 \times 10^{6}$ | [0.00 – ∞] |
| | HIV status | – | – | – |
| | Home delivery by TBA | 0.989 | $6.86 \times 10^{6}$ | [0.00 – ∞] |
| | Tooth extraction | 0.988 | $2.88 \times 10^{-7}$ | [0.00 – ∞] |

*TBA: Traditional birth attendant; CI: Confidence interval; OR: Odds Ratio Values in bold are statistically significant (p < 0.05)*

However, only 2.5% (n=6) of the participants knew that Hepatitis B cannot be transmitted by breathing air when a person with hepatitis B coughs or sneezes besides you.

- ***Knowledge of Natural History of Hepatitis B***

With regards to the knowledge on the natural history of hepatitis B of the participants, table 5 shows that most of them knew that Hepatitis B can damage the liver (n=181; 76.7%), cause liver cancer (n=181; 76.7%), most infected persons are asymptomatic ( n=178; 74.5%), people with hepatitis B can be infected for life (n=175;74.2%), and alcohol further damages the liver in patients with hepatitis B (n=181; 76.6%).

- ***Factors associated with Knowledge level***

From table 6, we see that Kouhouat Health area of residence (OR=1.458; p=0.040; CI= [1.040 – 1.791]) and past history of blood transfusion (OR= 4.628; p=0.044; CI= [1.048-12.675]) were statistically associated with knowledge level of the participants. (Figure 1)

## DISCUSSION

From table 4 below, 76 % (n=190) of the participants knew that Hepatitis B can be transmitted through unprotected vaginal and/or oral sex with an infected person with hepatitis B. This finding is different from that reported in a study on the knowledge of and attitudes towards hepatitis B and its transmission from mother to child among pregnant women in Guangdong Province, China. (Han et al., 2017) in which 54.4% of the respondents did not know that HBV can be transmitted through unprotected sexual intercourse. This difference could be due to increase sensitization of the population on hepatitis B transmission routes in Bangourain Health district alongside HIV awareness counseling.

Also, most of the respondents knew that hepatitis B can be transmitted from Mother to child during pregnancy (n=178; 75.4%), child birth (n=181; 76.7%) and breast feeding (n= 178; 75.4%). This result is different form that reported by Han in China whereby only 20% of the respondent did not know that HBV can be transmitted from mother to infant. (Han et al., 2017). This is also different from the findings reported in Ghana where by only 18.9% of the respondents knew HBV can be transmitted from mother to child during pregnancy (Gebrecherkos *et al*., 2020). This difference could be explained by the fact that 97% of the participants had at least one child compared to the other studies. Thus they have been sensitized at least once during antenatal clinics.

With regards to the knowledge on the natural history of hepatitis B of the participants, most of the participants knew that Hepatitis B can damage the liver and cause liver cancer (n=181; 73.6%) . These findings are different from that reported in Ghana whereby only 28.5% of the participants believed that hepatitis B can cause liver cancer.(Gebrecherkos *et al.*, 2020). This difference could be explained by the fact that 97% of the participants had at least one child. Thus they have been sensitized at least once during antenatal clinics.

The global knowledge score of the participants ranged from 0 to 100% with an average score of 52.05 ± 42.89 %. Out of the 236 participants, 18.2% (n=43) had high knowledge, 39.40% (n=93) had moderate knowledge and 42.4% (n=100) had a poor knowledge as shown in Figure 1. Thus, 81.8% of the participants had insufficient knowledge on hepatitis B. This finding is similar to that reported in Ibadan whereby, 76% of all women had inadequate knowledge about hepatitis B infection. (Adeyemi et al., 2014) This is also similar to finding reported in a study in Ghana whereby knowledge on HBV and the infection was poor among the study participants (Kwadzokpui et al., 2020) as well as that conducted at the University of Gondar Comprehensive Specialized Hospital, Ethiopia with 74.4% of the participants within the poor knowledge. (Gebrecherkos *et al*., 2020)

There was a statistically significant association between health area of residence and high knowledge level on hepatitis B (p=0,040; OR=1,458; CI= [1,040 – 1,791]).



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Participants resident in Kouhouat were more knowledgeable compared to the other health areas. This could be explained by the fact that residents in Kouhouat health area are more cosmopolitan, with people coming from other towns to consult in a big health centre implanted in the village (Kouhouat Baptist Health Centre). This result is similar to that reported in Ethiopia whereby participants who lived in urban settings had a greater mean knowledge score (Mean = 4.5 ± 2.6) compared to those who lived in rural areas (Mean= 2.9 ± 2.5); ( p<0.001).(Gebrecherkos *et al.*, 2020). This is also similar to that reported by Kwadzokpui in which the proportion of pregnant women living in rural areas with poor knowledge on hepatitis B (80.54%) is statistically significantly higher compared to those leaving in urban areas (52.17%), with p = 0.006. (Kwadzokpui *et al*., 2020).

There was also a statistically significant association between history of blood transfusion and knowledge level on hepatitis B (p=0.044; OR= 4.628; CI= [1.048-12.675]). This could be explained by the fact that, patients are usually sensitized on the risk of blood transfusion before or after the transfusion amongst which hepatitis B. This is similar to reports in a study carried out among blood donors in the Bamenda Regional Hospital Blood Bank, Cameroon wherein blood donors had a better knowledge score compared to others. This is because blood donors and as well as receiver are usually sensitized on risk of transfusion including hepatitis B infection.(Samje et al 2021).

## CONCLUSION

In conclusion, this study reveals that knowledge of hepatitis B amongst pregnant women in the Bangourain health district is inadequate, with nearly nine in ten women demonstrating a low or moderate level of knowledge. Although the majority of participants are aware of sexual and mother-to-child transmission routes, gaps remain regarding non-sexual modes of transmission and the natural history of the disease. The low screening rate (11.9 per cent) and the complete absence of hepatitis B vaccination constitute major shortcomings in the prevention of mother-to-child transmission. Factors associated with a higher level of knowledge – living in a more cosmopolitan area (Kouhouat) and a history of blood transfusion suggest that exposure to information and health services plays a key role in the acquisition of knowledge. These findings call for the strengthening of health education on hepatitis B during antenatal consultations, the expansion of access to screening and free vaccination, and the implementation of community awareness campaigns targeting rural areas.

### Study Limit

This study has several methodological limitations. Firstly, its cross-sectional nature does not allow for the establishment of a causal relationship between the associated factors and the level of knowledge, but only associations. Secondly, data collection via a self-administered questionnaire is subject to reporting bias, as participants may overestimate their knowledge or provide socially desirable responses. Thirdly, the study was conducted in a single health district (Bangourain), which limits the generalisability of the results to all pregnant women in Cameroon. Fourthly, the predominance of participants living in rural areas (97.9 per cent) and of low socio-economic status (92.8 per cent with a monthly income of < 45,000 FCFA) may have influenced the results, which do not necessarily reflect the knowledge of women in urban areas. Fifthly, the lack of data on the participants' actual serological status (HBsAg test) means it is not possible to correlate knowledge with the actual prevalence of infection. Finally, the study did not assess barriers to access to screening and vaccination, which would have helped to identify potential areas for intervention. Multicentre studies covering both rural and urban areas, with a qualitative component exploring barriers to vaccination, are needed to confirm these findings.

### Author's contributions

All authors read and approved the final manuscript.

- KUM Jerry NGHA: Wrote the research proposal, carried out the research work, did data analysis and write up. Wrote this manuscript
- KENMEGNE NOUMSI Elvira Christelle: Assisted in carrying out the research work, data analysis and write up.
- Gilbert MUA AKWA: Assisted in carrying out the research work (Data Colletion)
- EKPO Ofem: Assisted in carrying out the research work, data analysis and write up.
- Phillip BASSEY: Codirected the write up of the proposal and the results, supervised the research process.
- Bernadine EKPENYONG : Codirected the write up of the proposal and the results, supervised the research process.
- EKPEREONE Esu: Codirected the write up of the proposal and the results, supervised the research process.
- ANTOR Ndep: Codirected the write up of the proposal and the results, supervised the research process.
- Margaret AKPAN: Codirected the write up of the proposal and the results, supervised the research process.

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### Declaration of Conflict of Interest

The authors declare that they have no conflicts of interest in relation to this study.

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